

ABSTRACT

A device capable of efficiently detecting a single-photon signal includes a matter system, sources of a first beam and a second beam, and a measurement system. The matter system has a first energy level and a second energy level such that a signal photon couples to a transition between the first energy level and the second energy level. The first beam contains photons that couple to a transition between the second energy level and a third energy level of the matter system, and the second beam contains photons that couple to a transition between the third energy level and a fourth energy level of the matter system. The measurement system measures a change in the first or second beam to detect the absence, the presence, or the number of the photons in the signal.